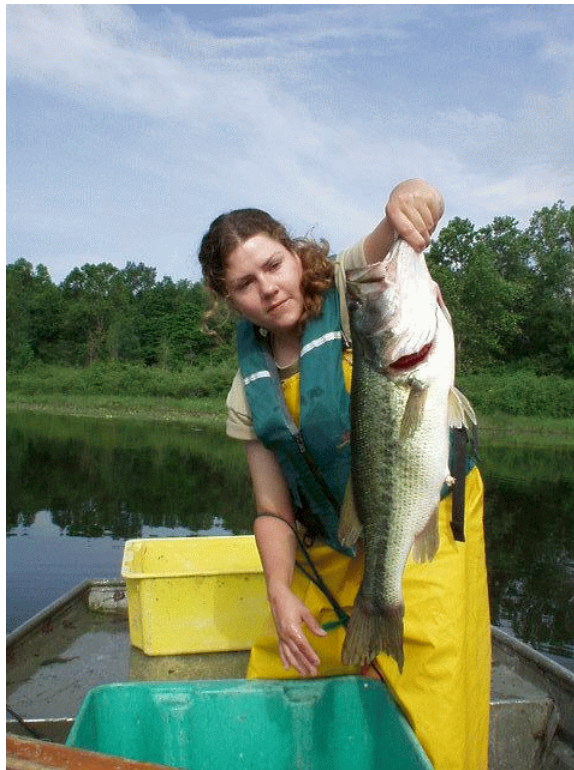


**FISH HARVEST AND BASS POPULATION SURVEYS AT
LAKE JAMES CHAIN O' LAKES
STEUBEN COUNTY
2000**

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EXECUTIVE SUMMARY

In 2000, fisheries biologists from the Indiana Division of Fish and Wildlife (IDFW) conducted bass population estimates and an angler creel survey at the five lakes known as the Lake James Chain. These lakes include James, Jimmerson, Snow, Big Otter and Little Otter. Together they encompass 1,953 acres of open water and an additional 146 acres of wetlands.

During late April and May 2000, fisheries biologists using nighttime DC electrofishing, captured, marked and released 9,782 largemouth bass at the Lake James Chain. A total of 11,083 bass were handled which included 1,301 recaptures. The largemouth bass population in the chain was estimated at 33,517 fish. The population of stock size largemouth bass, those eight inches in length or longer, was estimated at 25,735 fish. Bass population estimates were also determined for each lake in the chain. Due to their small size and location, Big and Little Otter Lakes were combined and treated as one lake. The estimated number of stock size largemouth bass per acre was nine in Lake James, 17 in Jimmerson Lake, 21 in Snow Lake and 24 in the Otter Lakes. In addition, 481 smallmouth bass were collected at Lake James resulting in an estimate of 1,669 fish. Very few smallmouth bass were collected from any of the other lakes.

A 12 inch minimum size limit was placed on largemouth bass by the IDFW in 1990. The minimum length limit was increased to 14 inches in the fall of 1998. Prior to imposition of the 12 inch size limit, base-line information on largemouth bass populations was collected by conducting population estimates at 13 large and 21 medium size natural lakes. Lakes in the Lake James Chain were not part of the base-line study. Comparisons, based on average bass population estimates obtained from the 34 study lakes, indicate the number of stock size bass per acre in Lakes James, Jimmerson, Snow and the Otters have increased 5%, 50%, 88% and 106% respectively. One of the objectives for implementing the 12 inch minimum size limit was to increase over-all bass numbers. It appears this has been accomplished, at least in the medium size lakes. Other factors, such as the huge increase in catch and release bass fishing have undoubtedly contributed as well. The 14 inch minimum length limit on the Lake James Chain bass populations needs to be in effect several more years before its impact, if any, can be

determined.

An angler creel survey was also conducted at the Lake James Chain. Three creel clerks interviewed anglers five days per week from May 5 through October 31, 2000. The main objectives of this survey were to estimate total fishing pressure, fish harvest, fishing pressure by tournament anglers and the number of bass caught and released.

During the five month creel survey period, anglers fished a total of 66,771 hours on the Lake James Chain, 34 hours per acre. Statewide, fishing pressure less than 50 hours per acre is considered low. Fishing pressure ranged from 10,687 hours on the Otters to 23,006 hours on Jimmerson Lake. Fishing pressure by lake was 19 hours per acre at James, 33 hours per acre at Snow, 53 hours per acre at Jimmerson and 103 hours per acre at the Otters.

A total of 46,062 fish were harvested. Bluegill (38,392), redear (2,886) and black crappie (2,167) dominated the harvest. Only 570 largemouth bass and 47 smallmouth bass were harvested. An additional 25,663 largemouth bass and 1,291 smallmouth bass were caught and released.

In addition to what they caught, and how long they fished, anglers were asked what they were fishing for, where they lived, if they had used one of the state-owned access sites that day, and to rate the quality of fishing at the Lake James Chain.

Largemouth bass (43%) was the species most sought by anglers followed by bluegill (19%). Anglers from 37 Indiana counties fished on the Lake James Chain during the survey. Lake James Chain residents were the most represented at 24%, followed by Steuben County residents at 21% and Allen County residents at 19%. Out-of-state anglers comprised 15% of the fishing parties interviewed with Ohio leading at 9%. Of the total angler parties interviewed, 30% had used one of the state-owned ramps that day. In response to fishing quality, nearly 50% of all anglers indicated that fishing had stayed the same, 27% felt it improved and 23% said it had declined.

Thirty bass tournaments were held on the Lake James Chain in 2000. Seventy percent of these were organized by Indiana clubs, 23% by Ohio clubs and 7% by Michigan clubs. Only two tournaments were conducted by non-residents when there was a *closed season* on bass fishing in their state. Nine of the 30 tournaments had more than 15 registered boats.

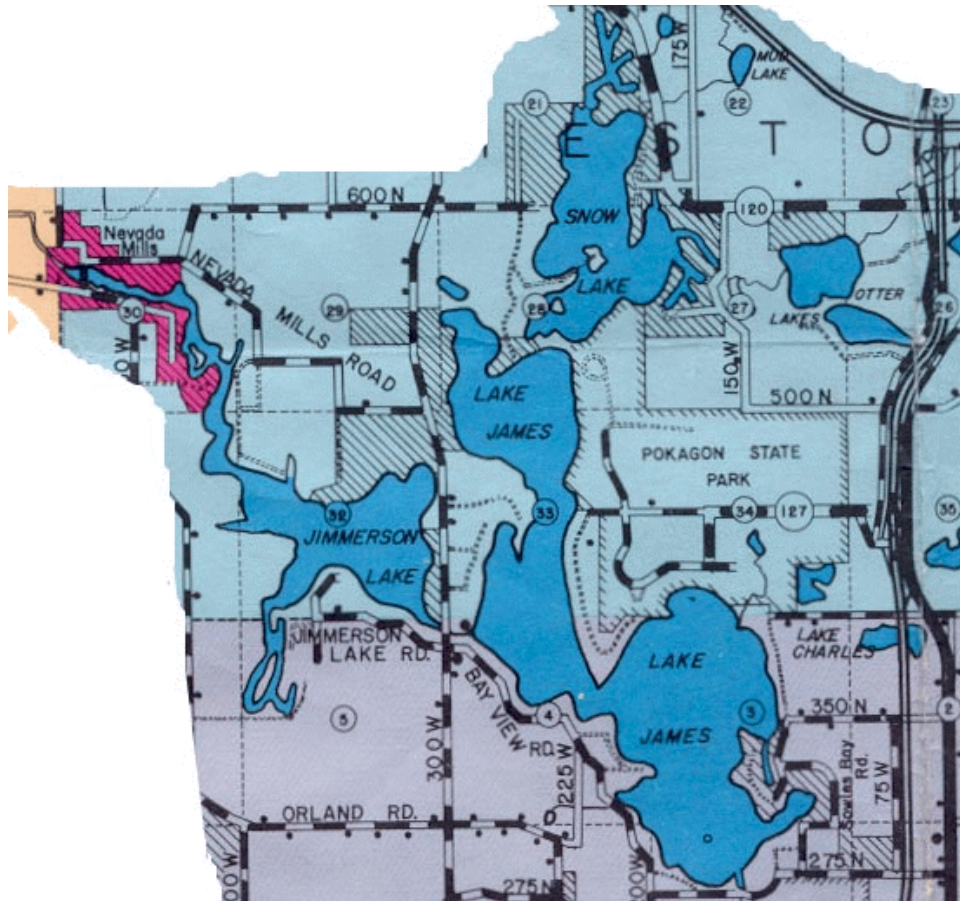
A total of 1,069 bass tournament anglers fished approximately 8,680 hours which represented 13% of the total fishing pressure. The average number of boats and bass anglers per tournament was 19 and 37 respectively. Tournament anglers weighed-in a total of 750 legal size bass, an average of 25 per tournament. The average number of bass allowed per tournament boat was six even though 10 could have legally been possessed. Tournament anglers had a catch rate of 0.78 bass per hour while non-tournament anglers fishing specifically for bass caught bass at a slightly higher rate; 0.82 per hour.

Non-tournament anglers were asked whether they thought tournament fishing had any affect on fishing and whether tournament fishing affects the Lake James Chain any other way. Only 20% of non-tournament anglers indicated that tournaments had an affect on fishing and 18% felt it affected the chain in other ways. Numerous reasons were given by anglers for why they felt tournament fishing affected fishing on the chain. The most popular reason given (27%) was that bass numbers were hurt by catching them off spawning beds. The second most common response (24%) was that bass numbers were hurt by not releasing them back into the same lake where they were caught. The number one reason given for how tournaments affect the lakes in other ways was increased boat congestion (22%) followed by discourteous or unsafe boat operations including boat speed (17%).

The Lake James Chain provides good sport fishing opportunities dominated by bluegill and largemouth bass. The harvest of bass is relatively small while bass catch and release is significant. Total fishing pressure on the chain is considered low. However, pressure on the Otters is approaching the high range. Bass tournaments on the chain are popular, but overall, they only comprised 13% of the fishing pressure. The Lake James Chain attracts the smaller, local club tournaments compared to the larger events documented at Lake Wawasee.

The majority of anglers do not believe tournaments hurt fishing or affect the lakes. Based on the average number of bass present in the study lakes prior to implementing the 12 minimum size limit, the number of bass in the chain has increased.

Figure 1. Map of Lake James Chain O' Lakes.



INTRODUCTION

The Lake James Chain is a group of five natural lakes located approximately one mile north of Angola, Indiana in Steuben County. The lakes flow from east to west in the following order from upstream: Little Otter Lake, Big Otter Lake, Snow Lake, Lake James and Jimmerson Lake. The five lakes total 1,953 acres of open water. Lake James is the largest (1,127 acres) followed by Snow (366 acres), Jimmerson (357 acres), Big Otter (69 acres) and Little Otter (34 acres). There are an additional 146 acres of wetlands on the five lakes. The channels connecting the lakes are navigable allowing for boating between the lakes. There is a bridge over the channel between Lake James and Jimmerson Lake and one over Follette's Creek, which connects Big Otter Lake to Snow Lake. These bridges restrict the size of boats able to pass between the lakes.

Access to lakes in the James Chain can be gained in various ways. The IDFW purchased land and developed two public access sites on the chain in the late 90s.. One is located on the northeast shore of Big Otter Lake just off of State Road 120 on Lane 385, while the other is located on the north shore of Jimmerson Lake on Lane 340. Both sites have handicap accessible concrete boat ramps and ample parking. The Big Otter Lake site will accommodate approximately 40 vehicles with trailers while the Jimmerson Lake site will accommodate approximately 15. Access may also be gained for a fee from three private ramps located on the Lake James Chain. One is located on Little Otter Lake, another is on the middle basin of Lake James and a third lies on the channel between Lake James and Jimmerson Lake. Launching a boat at any of these sites will allow access to the entire chain. The size of these lakes, coupled with the ease of moving from one lake to the other, make these popular destinations for fisherman as well as other water sports enthusiasts.

Lake James is the largest of the five lakes in the chain. This natural lake has a total surface area of 1,127 acres as well as an additional 13 acres of wetlands. Lake James has an average depth of 27 feet and a maximum depth of 88 feet. The lake is divided into three basins known as the upper, middle and lower basins. There are four inlets on Lake James. The main inlet enters on

the north end of the lake's upper basin and connects Lake James to Snow Lake. This is a relatively short, navigable channel. Another inlet is Croxton Ditch which comes into the lake on the south shore of the lower basin. Additional inlets include one located on the northeast shore of the lower basin which drains Lake Lonidaw in Pokagon State Park and a small ditch which enters the lower basin on the west shore and drains a small pond. The outlet is a navigable channel located on the southwest shore of the middle basin that flows into Jimmerson Lake. The shoreline of Lake James is developed approximately 95% with summer cottages and year round homes. Pokagon State Park is located on the east shore of the upper basin and the northeast shore of the middle basin. The park has two swimming beaches on Lake James as well as a boat rental and docks for use by park patrons.

Snow Lake is a 422 acre natural lake located between Big Otter Lake and Lake James. It is comprised of 366 acres of open water and 56 acres of marsh consisting mainly of cattails. Snow Lake is the second largest lake in the chain and has an average depth of 28 feet and a maximum depth of 84 feet. The main inlet to Snow Lake is Follette's Creek, a navigable stream which enters the lake on the east shore and connects Snow Lake to Big Otter Lake. Two other unnamed inlets enter the lake on the north shore. They both originate from small lakes. Snow Lake's outlet is a navigable channel that leaves the lake on the south shore and flows into Lake James. Approximately 75% of the shoreline is developed with summer cottages and year round homes. Pokagon State Park is located on the southeast shore of the lake.

Jimmerson Lake is the third largest lake in the chain. This natural lake has an open water area of 357 acres, and when combined with an additional 77 acres of wetlands, totals 434 acres. It has an average depth of 18 feet and a maximum depth of 55 feet. Jimmerson Lake is the last lake in the chain and its outlet, Crooked Creek, leaves the lake via a spillway in the northwest corner of the lake at Nevada Mills. The inlet to Jimmerson Lake is a navigable channel which enters the lake on the southeast shore and connects Jimmerson to Lake James. Summer cottages and permanent homes occupy approximately 90% of Jimmerson's shoreline. The remainder is comprised of wetlands, wooded areas and agricultural fields.

One unique feature of Jimmerson Lake is the Jimmerson Lake Wetland Conservation Area. This area consists of two wetlands, 14 and 54 acres in size. The 14 acre wetland is an island located on the southwest side of the lake. The 54 acre wetland is described as the land and water within the elevation of 965.84 feet and is generally the high water mark on a 965 foot elevation contour.

Big Otter Lake is a 69 acre natural lake with an average depth of 26 feet and a maximum depth of 38 feet. It is fourth largest of the five lakes in the Lake James Chain. There are two inlets to Big Otter. A very short navigable channel is located on the south shore and connects Big Otter Lake with Little Otter Lake. The other inlet is located on the northeast shore of the lake. It drains several wetlands to the east and north. Recent commercial development of areas adjacent to the wetlands has resulted in increased runoff that enters these wetlands and eventually Big Otter Lake. The outlet of the lake is Follette's Creek. This boatable creek leaves Big Otter Lake on the west shore and flows into Snow Lake. The shoreline of Big Otter Lake is approximately 80% developed with summer cottages or permanent homes.

The smallest lake in the Lake James Chain is Little Otter Lake. This 34 acre natural lake has an average depth of 21 feet and a maximum depth of 34 feet. The lone inlet to Little Otter is a channel that enters the lake on the east side. This channel flows through a culvert which passes under Interstate 69 and connects Little Otter Lake with Marsh Lake. The channel is big enough to accommodate small boats. Little Otter Lake's outlet is a short boatable channel that leaves the lake in the northwest corner and flows to Big Otter Lake. Approximately 70% of the shoreline is developed with summer cottages and year round homes. Many of these homes, especially on the south shore, are located well off the shoreline and the cattail marshes surrounding the lake have been protected except for openings wide enough to put a pier out to the lake. A bait and tackle store, with a boat ramp and small campground, are located on the east end of the lake along the inlet channel.

ANGLER CREEL SURVEY

METHODS AND MATERIALS

The angler creel survey, the first to be conducted at any of the lakes in the Lake James Chain, began May 5, 2000 and ran through October 31, 2000. There were numerous objectives in this survey including the measurement of total fishing pressure, fish harvest and catch and release fishing for largemouth bass, smallmouth bass and northern pike. Other objectives included determining the species anglers fished for most and how they viewed fishing quality at these lakes. The impact of tournament fishing was explored as well as angler attitudes towards tournaments. Each lake was surveyed separately, except for Big and Little Otter Lakes. Due to their small size and close proximity, coupled with limited funds to hire angler analysts, the two lakes were combined and will be referred to as the Otter Lakes throughout this report.

Three angler analysts were used during this survey because of the number and size of lakes involved. The analysts conducted the creel survey five days each week. One analyst spent all survey days for the week on Lake James. Another analyst spent four days at Jimmerson Lake and one day at the Otter Lakes each week. The third analyst spent four days at Snow Lake and one day at the Otter Lakes each week. This resulted in Lake James being surveyed three weekdays and both weekend days each week; Jimmerson and Snow Lakes were surveyed three weekdays and one weekend day each week and the Otter Lakes were surveyed on one weekday and one weekend day each week. The fishing day was divided into two periods. The morning period began at 6:30 a.m. and ended at 2:00 p.m. while the afternoon period began at 2:00 p.m. and ended at 9:30 p.m. The number of anglers at each lake was counted at various times throughout the day to obtain a measure of total fishing pressure. The number of angler counts varied at each lake based on lake size and the amount of time required to make a count. Angler counts were conducted on Lake James and Jimmerson Lake twice a day and on Snow Lake and the Otter Lakes three times a day. Anglers were interviewed at the completion of their fishing trip or at the end of the analysts' shifts. Interviews were then recorded as either complete or incomplete respectively. Information collected from anglers included the name of the lakes in the chain that

they fished that day, number of hours fished at each lake, number of fish harvested by species, length of fish harvested, and number of bass and northern pike caught and released. Anglers were also asked what species they were fishing for, their overall opinion of the fishery at the Lake James Chain, and if they had used a state access site to launch their boat that day. There were two additional questions regarding the impacts of tournament fishing on the fishery and/or lakes. All data was expanded separately by lake, weekend, weekday and month. Holidays were included with weekend periods. Data was also separated by boat and shore anglers. All fish weights were calculated using regional length-weight regressions.

RESULTS

During the six month survey, 1,011 fishing parties comprised of 2,005 anglers were interviewed. These anglers fished a total of 66,771 hours on the Lake James Chain or 34 hours per acre (Table 1). The majority of the fishing pressure occurred at Jimmerson Lake (35%) followed by Lake James (29%), Snow Lake (21%) and the Otter Lakes (5%). However, when fishing pressure per acre is examined, the Otter Lakes received almost twice as much pressure (104 hrs/acre) as the next closest lake, Jimmerson (53 hrs/acre). Lake James received the lowest amount of fishing pressure per acre at 19 hours followed by Snow Lake at 33 hours.

July was the month with the most fishing pressure at the chain (14,549 hours), followed closely by June (14,208 hours) and August (12,668 hours) (Table 2). Anglers only fished 5,612 hours in October, the least fished month. Top monthly fishing effort varied among the lakes. At Lake James, July was the most popular month (Table 3) while the Otters received their highest monthly pressure in August (Table 4). Anglers at both Jimmerson Lake (Table 5) and Snow Lake (Table 6) fished the most during June.

Of the 1,011 fishing parties interviewed, 17% fished at more than one lake in the chain per trip. The average length of a fishing trip to a particular lake by a boat angler was four hours. There were not enough complete interviews of shore anglers to compute an average fishing trip length for them.

A total of 46,062 fish weighing 16,739 pounds were harvested from the Lake James Chain during the survey. The catch rate was 0.69 fish per hour (Table 7). Jimmerson Lake led all lakes in total harvest with 16,407 fish (36%), followed by Snow Lake with 11,670 fish (25%), Lake James with 9,983 fish (22%) and the Otter Lakes with 8,002 fish (17%) (Tables 8-11). Snow Lake had the best success rate in fish harvested per hour (0.84) followed by the Otter Lakes (0.75), Jimmerson Lake (0.71) and Lake James (0.52). The dominant species harvested at the Lake James Chain by number were bluegill (83%), followed by redear (6%), black crappie (5%) and yellow perch (2%). Bluegill harvest ranked first at every lake in the chain by number. Redear was the second most common species harvested by number at three of the four lakes. The exception was the Otter lakes where black crappie ranked second by number and redear were third. Yellow perch ranked third in number at two of the lakes (Jimmerson and Snow) while the third ranked species by number at Lake James was black crappie. Boat anglers harvested 96% of the fish and exerted 92% of the total fishing pressure at the Lake James Chain.

The total pounds of fish harvested from the Lake James Chain was 16,739; nine pounds per acre. Jimmerson Lake had the highest yield (5,691 lb) followed by Snow Lake (4,377 lb), Lake James (4,186 lb) and the Otter Lakes (2,483 lb). The dominant species harvested by weight at the chain was bluegill (73%), followed by redear (10%), largemouth bass (7%) and black crappie (5%). Bluegill was the dominant species in the harvest at each lake, comprising 69% or more of the total pounds taken. The Otter Lakes produced more pounds of fish per acre (24) than any other lake in the chain followed by Jimmerson Lake (16), Snow Lake (12) and Lake James (4). The smallest lake in the chain (the Otters) produced 6.5 times as many pounds of fish per acre as the largest lake, Lake James.

Bluegill

Bluegill ranked first among all species harvested from the Lake James Chain both by number and weight. The 38,392 bluegill harvested ranged in length from five to twelve inches and averaged 7.3 (Table 12). Just over 96% of the bluegill were six inches in length or larger. Eight inch and

larger bluegill comprised 31% of the harvest while nine and ten inch fish contributed 11% and 3% respectively. The 12,192 pounds of bluegill harvested was more than seven times as much as the next closest species. Bluegill were harvested from the Lake James Chain at a rate of 0.57 per hour and 20 fish per acre. Jimmerson Lake ranked first in total bluegill harvest at 16,407 fish (35%), followed by Snow Lake at 11,607 fish (27%), Lake James at 8,245 fish (22%) and the Otter Lakes at 6,384 fish (17%). They were harvested at the highest hourly rate at Snow Lake (0.73) followed by the Otter Lakes (0.60) and Jimmerson lake (0.59). The Otter Lakes yielded the highest number of bluegill per acre (62) followed by Jimmerson Lake (38) and Snow Lake (28). Average bluegill yield at Indiana's natural lakes is 30 per acre.

Redear

A total of 2,886 redear weighing 1,598 pounds were harvested during this survey (Table 13). Redear ranked second in both number and weight of species harvested from the chain. They ranged in length from 5.5 to 12.5 inches and averaged 8.9. Fish nine inches in length or larger comprised 59% of the total redear harvest. Approximately 24% were 10 inches or larger while 5% were eleven inches or larger. Harvest per hour was 0.08 at Jimmerson Lake, twice that for the entire chain (0.04). Jimmerson Lake also yielded the highest number of redear per acre at five with Snow Lake being the next closest at one. By number, Jimmerson Lake again yielded the most redear (1,942) followed by Snow (508), James (397) and The Otters (39).

Black Crappie

Black Crappie ranked third by number (5%) and fourth by weight (5%) among the species harvested from the Lake James Chain. The 2,167 black crappie harvested averaged 8.7 inches in length and weighed 835 pounds (Table 14). Harvestable size crappie (8.5 inches in length or larger) comprised 56% of the total harvest. Crappie 10 inches in length or larger and 12 inches in length or larger comprised 28% and 6% of the harvest respectively. The largest crappie measured 13.5 inches. Crappie were harvested at 1.1 fish per acre, 0.4 pounds per acre and 0.3 fish per hour. A total of 1,538 crappie were harvested from the Otter Lakes followed by 372 from Lake James, 218 from Snow Lake and only 39 from Jimmerson Lake. By far, the highest

number of crappie harvested per hour was at the Otter Lakes (0.14) followed by Snow Lake and Lake James, both at 0.02 per hour. The Otter Lakes also dominated in the categories of number harvested per acre and pounds harvested per acre at 15 and five respectively. The next closest lake in both number per acre (0.6) and pounds per acre (0.4) was Snow.

Yellow perch

A total of 1,106 yellow perch weighing 338 pounds were harvested (Table 15). Perch ranked fourth in abundance (2%) and fifth by weight (2%) among species harvested at the Lake James Chain. Perch were harvested at a rate of 0.02 per hour and 0.6 per acre. Jimmerson Lake had the highest yellow perch harvest by number with 475, followed by Snow Lake with 369, Lake James with 257 and the Otter Lakes with five. The highest number of pounds per acre occurred at Jimmerson (1.3) followed by Snow Lake (1.0) and Lake James (0.2). Perch were third in abundance at both Jimmerson (3%) and Snow Lakes (3%) while they ranked fifth at Lake James (3%) and the Otter Lakes (0.1%). Yellow perch harvested from the Lake James Chain averaged 8.1 inches in length and 52% were eight inches in length or larger. In addition, 18% were 10 inches in length or larger with the largest being 12 inches.

Largemouth bass

Largemouth bass ranked fifth among species harvested by number (1%) at the Lake James Chain and third by weight (7%). The length of bass harvested ranged from 11 to 23 inches and averaged 15.4 (Table 16). Only six of the 570 bass harvested were smaller than the legal minimum size of 14 inches. Largemouth bass were harvested at a rate of 0.01 per hour and 0.3 per acre. Average harvest from Indiana natural lakes from 1972 through 1994 was 0.03 bass per hour and two per acre. One-hundred and ninety eight bass were harvested from Lake James which ranked first among the lakes by number. Jimmerson Lake followed closely with 169 bass and Snow Lake was third with 167. Largemouth bass harvest per acre varied from 0.5 at Jimmerson Lake to 0.2 at Lake James. Pounds per acre of largemouth bass harvested was also highest at Jimmerson Lake (1.0), followed by Snow Lake (0.9), the Otter Lakes (0.8) and Lake James (0.3).

While largemouth bass harvest was not a major component of the fishery at the Lake James Chain, catch and release of bass was. A total of 25,663 largemouth bass were caught and released at the Lake James Chain. Lake James led in catch and release by a narrow margin over Jimmerson Lake with 8,147 bass to Jimmerson's 8,128. This was followed by Snow Lake with 6,152 and the Otter Lakes with 3,236. The number of largemouth bass caught and released at the chain was 13 per acre. Catch and release of largemouth bass at Indiana natural lakes from 1972 through 1994 averaged seven per acre. Overall at the Lake James Chain, largemouth bass catch per effort was 0.38 fish per hour. From 1972 through 1994, the average largemouth bass catch per hour at natural lakes was 0.14.

Rock bass

Rock bass were harvested at three of the four lakes in the chain, the Otters being the exception. A total of 552 rock bass weighing 256 pounds and averaging 8.4 inches in length were taken (Table 17). Rock bass comprised 1 % of the harvest from the chain by number and 2% by weight, both ranking sixth. Harvest was highest at Lake James with 339 fish followed by Jimmerson with 148 and Snow with 65.

Other Species

Five additional species were harvested from the Lake James Chain O' Lakes during the 2000 creel survey. These include, in descending order of abundance; warmouth, northern pike, smallmouth bass, bullheads and pumpkinseed. Of these, northern pike and smallmouth bass generally attract the most interest from anglers. A total of 87 northern pike (Table 18) and 47 smallmouth bass (Table 19) were harvested, ranging up to 26.5 and 18 inches in length respectively. The majority of the pike (69) and all of the smallmouth were caught in Lake James. In addition to those harvested, 1,291 smallmouth and 241 pike were caught and released (Table 20). Smallmouth bass catch and release predominantly came from Lake James (66%) while Jimmerson accounted for 18% and Snow 16%. The majority of the northern pike caught and released also came from Lake James (65%) followed by Snow Lake (20%) and Jimmerson Lake (15%). The combined harvest of warmouth, bullheads and pumpkinseed was 231 fish weighing

85 pounds (Table 21).

Lake James

Total fishing pressure exerted by Lake James anglers was 19,193 hours or 19 hours per acre. Fishing pressure was highest in July (24%), followed by August (19%), May (18%) and June (18%). October had the lowest fishing pressure of all the months (9%) but the highest catch occurred during this month. In all, anglers harvested 0.52 fish per hour from Lake James and 3.7 pounds of fish per acre.

A total of 9,983 fish weighing 4,186 pounds were harvested from Lake James during the survey. The dominant species by number was bluegill (83%), followed by redear (4%), black crappie (4%), rock bass (3%), yellow perch (3%) and largemouth bass (2%). Bluegill was also the dominant species by weight (69%), followed by largemouth bass (9%) , redear (6%) and northern pike (4%). Harvest of all species combined was highest in October (35%) followed by June (33%) and August (15%). These three months combined accounted for 83% of all the harvest at Lakes James during the six months the creel was conducted.

A total of 8,245 bluegill were harvested from Lake James (Table 22). This placed Lake James third among the lakes in the chain in this category. However, the average length of bluegill harvested from Lake James (7.6 inches) ranked first. The percentage of fish eight (41%), nine (17%) and ten (4%) inches in length or larger was also highest at Lake James compared to the other lakes in the chain. Bluegill was the dominant species harvested from Lake James both by number (83%) and weight (69%). October was the best month to fish for bluegills at Lake James as 41% of the harvest occurred this month. June was the second best month (32%) for bluegill followed by August (14%).

Redear ranked second among species harvested from Lake James by number (4%) and third by weight (6%). Lake James yielded the third highest redear harvest of all the lakes in the chain (397). However, average size of redear from Lake James ranked first at 9.2 inches (Table 23).

Lake James redear also ranked first in regards to the percentage nine and ten inches in length or larger at 69% and 31% respectively. Redear were harvested at a rate of 0.02 per hour and 0.4 per acre from Lake James. Harvest during June accounted for 64% of the redear catch at Lake James.

The 372 black crappie harvested placed them third by number (4%) and seventh by weight (3%) among Lake James species (Table 24). They were harvested at a rate of 0.02 per hour and 0.3 per acre. Lake James crappie averaged 8.7 inches in length and approximately 27% were ten inches in length or larger. An additional 2% were 12 inches in length or larger. Lake James had the second highest crappie harvest by number (17%) among all the lakes in the chain. Peak months for crappie harvest were May (42%) and August (40%).

Rock bass harvest at Lake James was 339 fish weighing 155 pounds (Table 25). Rock bass ranked fourth by number (3%) and fifth by weight (4%). They ranged in length from 6.5 to 10.5 inches and averaged 8.4. Lake James led all lakes in the chain in the harvest of rock bass, and in fact, more were taken from James than all other lakes combined.

Yellow perch harvested from Lake James ranged from 7.0 to 11.5 inches in length and averaged 10.0 (Table 26). Perch ranked fifth among species harvested by number (3%) and tied with crappie for sixth by weight (3%). Over 44% of the perch harvest at Lake James occurred in September. Lake James ranked third among the lakes in number of perch harvested (23%), besting only The Otters. The 257 perch harvested weighed 140 pounds.

One hundred ninety eight largemouth bass weighing 358 pounds were harvested from Lake James (Table 27). Bass ranked sixth by number (2%) and second by weight (9%) among species harvested. They ranged in length from 14 to 20 inches and averaged 15.1. Lake James led all lakes in bass harvest (35%). It also led in number of largemouth bass caught and released (32%) edging out Jimmerson Lake by 19 fish. Bass harvest was highest in June (36%) followed by July (22%). The highest ranking month for largemouth bass catch and release was May (33%)

followed by July (23%) and June (17%). Lake James had the lowest overall bass catch rate of any lake in the chain at 7 per acre.

Sixty-nine northern pike were harvested from Lake James, comprising over 79% of the total pike harvest at the chain. They ranged in length from 21 to 24.5 inches and weighed 176 pounds (Table 28), which ranked pike fourth by weight. Over 49% of the pike harvest occurred in September while 33% were caught in August and 17% in July.

Smallmouth bass harvest at Lake James represented the only harvest of this species in the entire chain. They ranged in length from 13.5 to 18 inches and averaged 15.2 (Table 29). Smallmouth bass comprised only 0.5% of the total fish harvest at Lake James.

In addition to the northern pike and smallmouth bass harvested, 157 and 846 of each species respectively were caught and released (Table 30).

Other species harvested at Lake James included 46 warmouth and 13 bullheads (Table 31).

Snow Lake

Anglers fished at Snow Lake for 13,884 hours, or 33 hours per acre. Fishing pressure was highest in June (25%), followed by May (17%), September (17%) and July (16%). October had the lowest fishing pressure of all the months (12%) but the highest catch occurred during this month. In all, anglers harvested 0.84 fish per hour at Snow Lake and 12 pounds of fish per acre.

A total of 11,670 fish weighing 4,377 pounds were harvested from Snow Lake. The dominant species by number was bluegill (87%), followed by redear (4%), yellow perch (3%), black crappie (2%) and largemouth bass (1%). Bluegill was also the dominant species by weight (78%), followed by largemouth bass (7%) and redear (7%). October led all months in harvest (24%) followed by August (21%) and June (21%).

Bluegill dominated the Snow Lake harvest, ranking first numerically (87%) and by weight (78%). Snow Lake ranked second among lakes in the chain in bluegill harvest. The 10,186 bluegill averaged 7.5 inches in length and weighed 3,407 pounds (Table 32). Snow Lake bluegill ranked second in average length and in the percentage of fish eight inches in length or larger (33%). It also ranked second in the percentage of bluegill harvested that were nine and ten inches in length or larger (12 % and 4% respectively). October was the best month to fish for bluegill at Snow Lake as 25% of the harvest occurred during this month. This was followed closely by August (21%), June (20%) and September (19%).

A total of 508 redear weighing 299 pounds were harvested. They ranged in length from 6.0 to 12.0 inches and averaged 9.0 (Table 33). Redear ranked second among species harvested from Snow Lake by number (4%) and third by weight (7%). Approximately 44% of the Snow Lake redear were nine inches in length or larger. Snow Lake had the second highest percentage of redear harvested that were ten inches in length and larger at 26%. Fourteen percent were 11 inches in length or larger, which led all the other lakes in the chain. Just over one-half of the eleven inch and larger redear harvested at the Lake James Chain came from Snow Lake. The highest monthly redear harvest occurred in October (39%) which more than doubled the next closest month, August (19%). Overall, redear were harvested from Snow Lake at a rate of 0.04 per hour and 1.4 per acre.

The species that ranked third numerically in the Snow Lake catch was yellow perch (3%). The 369 perch harvested ranged in length from 6.0 to 12.0 inches and averaged 8.3 (Table 34). Snow Lake ranked second in perch harvest among the lakes in the chain. Perch anglers at Snow had the most success in August (33%) and September (24%) when 212 of the 369 perch harvested during the survey were caught.

Black crappie ranked fourth among species harvested at Snow Lake by both number (2%) and weight (3%). They ranged in length from 8.5 to 13.5 inches and averaged 10.4 (Table 35), the highest average length recorded at the chain. Over 72% of the crappie harvested at Snow Lake

were ten inches in length or larger and 12% were 12 inches in length or larger. The 218 crappie harvested weighed 136 pounds. Crappie harvest was highest in May (24%) but no month was really dominant.

A total of 167 largemouth bass weighing 318 pounds were harvested from Snow Lake. Bass ranked fifth by number (1%) and second by weight (7%) among species harvested. They ranged in length from 14 to 20 inches and averaged 15.4 (Table 36). Snow Lake was third among all lakes in bass harvest (29%). Largemouth bass caught and released at Snow totaled 6,152 which also placed third. Bass harvest was highest in June (41%) followed by July (28%). The highest ranking month for the catch and release of largemouth bass was June (28%) followed closely by May (26%). Overall, bass were caught at Snow Lake at a rate of 17 per acre, which ranked third among lakes in the chain.

Rock bass ranked seventh among species harvested at Snow Lake by number (0.6%) and eighth by weight (0.8%). They ranged in length from 7.0 to 10.0 inches and averaged 8.3 (Table 37). Over 60% of the rock bass harvested at Snow Lake were eight inches in length or larger. The 65 rock bass harvested weighed 29 pounds.

Other species harvested at Snow Lake included 145 warmouth and 10 northern pike. An additional 48 pike, and 209 smallmouth bass, were caught and released at Snow Lake (Table 38).

Jimmerson Lake

Total fishing pressure at Jimmerson Lake was 23,007 hours or 53 hours per acre. This was the highest effort at the chain. Fishing pressure was highest in June (24%), followed by July (23%), then August and May (both 19%). October had the lowest fishing pressure (7%). In all, anglers harvested 0.71 fish per hour and 16 pounds of fish per acre from Jimmerson.

Jimmerson Lake fish harvest included 16,407 fish weighing 5,691 pounds. Both of these numbers rank first among the lakes in the chain. The dominant species harvested by number was

bluegill (83%), followed by redear (12%), yellow perch (3%) and largemouth bass (1%). Bluegill was also the dominant species by weight (71%), followed by redear (18%) and largemouth bass (6%). More fish were harvested in June than any other month (25%) followed by May, October and July, all with 17%.

A total of 13,55 bluegill weighing 4,063 pounds were harvested from Jimmerson Lake (Table 39). This was the highest number harvested from any lake in the chain. Bluegill ranked first by number and weight among species harvested. They ranged in length from 5.0 to 12.0 inches and averaged 7.2 inches which tied for last with the Otter Lakes. Bluegill eight inches and larger comprised 28% of the total catch, the second lowest among the four lakes. Nine inch and larger fish accounted for 10% of the total harvest while ten inch and larger fish comprised 3%. These numbers were also second lowest among lakes in the chain. Bluegill harvest at Jimmerson Lake was highest in June (23%) followed by October (19%) and May (18%). They were harvested at a rate of 38 fish per acre and 0.59 per hour.

Jimmerson Lake ranked first in redear harvest, comprising 67% of the total for the chain. The 1,942 redear harvested weighed 1,044 pounds and averaged 8.9 inches in length which was also the average for the chain (Table 40). Approximately 55% of the redear were 9 inches in length or larger, slightly under the average percentage for the chain. In addition, 19% were ten inches in length or larger and 4% were 11 inches in length or larger. The largest Jimmerson Lake redear measured 12.5 inches in length. Redear comprised 12% of the Jimmerson Lake fish harvest by number and 18% by weight, both second in their respective categories. Redear harvest was highest in June when over 38% occurred. This was followed by July with 24% and May with 14%. Harvest per hour was 0.08 at Jimmerson Lake, twice the average for the entire chain (0.04). Jimmerson also yielded the highest number of redear per acre at five with Snow Lake being the next closest at one.

Yellow perch comprised 3% of the Jimmerson Lake harvest by number and 1% by weight. A total of 475 perch weighing 80 pounds were harvested (Table 41). They ranged in length from

5.5 to 9.0 inches and averaged 6.9. More perch were harvested from Jimmerson Lake than any other lake in the chain (43)%. Perch harvest was highest in July (35%) and June (31%).

A total of 169 largemouth bass weighing 344 pounds were harvested from Jimmerson Lake (Table 42). Bass ranked fourth by number (1%) and third by weight (6%) among the species harvested. They ranged in length from 11.0 to 21.5 inches and averaged 15.6. Jimmerson Lake was second among all lakes in bass harvest (30%). In addition, 8,128 largemouth bass were caught and released at Jimmerson which also ranked second. Bass harvest was slightly higher in June (33.1%) than July (32.5%) which were the two highest months. The highest ranking month for catch and release of largemouth bass was May (32%) followed by July (25%). Overall, the bass catch at Jimmerson Lake was 23 per acre, which ranked second among lakes in the chain.

Rock bass ranked fifth among species harvested at Jimmerson Lake by number (0.9%) and by weight (1.3%). They ranged in length from 7.0 to 10.0 inches and averaged 8.6 (Table 43). Over 87% of the rock bass harvested at Jimmerson Lake were eight inches in length or larger. The 148 rock bass harvested weighed 72 pounds.

Thirty-nine crappie weighing 21 pounds were harvested from Jimmerson Lake (Table 44). They ranged in length from 9.5 to 11.0 inches and averaged 10.0. Crappie harvest at Jimmerson was the lowest in the chain.

Additional species harvested at Jimmerson Lake included 24 warmouth, 17 bullheads, 10 pumpkinseed and eight northern pike (Table 45). Total weight of these four species was 68 pounds.

In addition to the largemouth bass catch and release mentioned previously, a total of 234 smallmouth bass and 36 northern pike were also caught and released at Jimmerson Lake (Table 46).

Otter Lakes

The Otter Lakes received the lowest total fishing pressure (10,687 hours) of all lakes in the chain. However, anglers fished an average of 104 hours per acre at the Otters which ranked first when considering fishing pressure per acre. Fishing pressure was highest in August (26%) followed by July (23%), June (18%) and September (18%). October had the lowest fishing pressure of all months surveyed (6%).

A total of 8,002 fish weighing 2,483 pounds were harvested from the Otter Lakes. The dominant species by number were bluegill (80%) and black crappie (19%). These two species also dominated the harvest by weight, comprising 74% and 22%, of the catch respectively. Anglers harvested 0.75 fish per hour from The Otter Lakes and 24 pounds per acre. Highest fish harvest at the Otter Lakes occurred in August (45%) and September (26%). Together, these two months accounted for 5,648 of the 8,002 fish harvested.

Bluegill dominated fish harvest at the Otter Lakes, comprising 80% of the catch by number and 74% by weight. A total of 6,384 bluegill weighing 1,844 pounds were harvested (Table 47). They ranged in length from 5.5 to 10.5 inches and averaged 7.2. This tied Jimmerson Lake for smallest average size. The percentage of eight, nine and ten inch bluegills in the Otter Lake catches was lower than at any of the other lakes. The Otter Lakes yielded the fewest number of bluegill in the survey, however, anglers harvested the highest number of bluegill per acre there (62). Bluegill were harvested from the Otter Lakes at a rate of 0.6 fish per hour. Highest bluegill harvest by number occurred in August (45%) followed by September at 32%.

Black crappie harvest at the Otter Lakes consisted of 1,538 fish weighing 538 pounds. Crappie comprised 19% of the total harvest by number and 22% by weight, both of which ranked second among all species. They ranged in length from 6.0 to 12.0 inches and averaged 8.5 (Table 48). Over 21% of the crappie harvested were ten inches in length or larger. More crappie were harvested from the Otter Lakes (71%) than all other lakes in the chain combined. The highest crappie harvest occurred in August (43%) followed by July (35%) and May (16%). Crappie were

harvested at a rate of 0.14 per hour and 15 per acre.

Largemouth bass ranked fourth by number (0.4%) and third by weight (3%) among the species harvested from the Otter Lakes. A total of 3,272 bass were caught at the Otter Lakes. Of these, only 36 were kept by anglers, the others being released. Harvested bass ranged from 14 to 23 inches in length and averaged 15.7 (Table 49). The Otter Lakes experienced the lowest bass catch by number of all lakes in the chain. However, the Otter Lakes ranked first in the number of bass caught per acre (32). The best month for catch and release bass fishing was September (39%). August ranked second at 22%, followed by July with 19% and June with 12%. In addition to the largemouth bass caught and released at the Otter Lakes, two smallmouth bass were caught and released (Table 50).

Other species harvested from the Otter Lakes included 39 redear and five yellow perch (Table 51). No northern pike were harvested from the Otter Lakes, the only place in the chain this occurred.

Most popular species

Angling parties were asked which species of fish they were pursuing during their fishing trip to the Lake James Chain that day. A total of 1,011 responded (Table 52). Largemouth bass (43%) was the species most sought by anglers followed by bluegill (19%). Panfish anglers, those fishing for bluegill, redear, crappie and yellow perch, ranked third at 16% followed by anglers fishing for anything they could catch that day at 14%. No other category represented more than 3% of the anglers who responded. An additional 3% of the anglers indicated they were fishing for bass in combination with another species.

County of residence

Anglers from 37 Indiana counties fished at the Lake James Chain during the six month long survey (Table 53). The farthest Indiana County represented was Gibson County, located in the extreme southwest corner of the state just north of Evansville. In addition, anglers from

Michigan, Ohio and other states fished at the chain. Out-of-state anglers comprised 15% of the parties interviewed with Ohio leading at 9%. Overall, Lake James Chain residents were the most represented at 24% followed by Steuben County residents at 21% and Allen County residents at 19%.

Additional questions

Two new public access sites with concrete boat ramps and gravel parking lots were recently constructed by the IDFW at the Lake James Chain. Anglers were asked if they had used one of these ramps to launch their boat that day. Of the total angler parties interviewed, 30% used one of the state owned ramps. Excluding lake residents, who typically have one or more boats moored on the lake, 40% of the anglers who launched a boat that day indicated they had used a state owned ramp while 60% used one of the private ramps.

In an effort to determine how anglers perceived fishing at the Lake James Chain, they were asked whether fishing at the chain *had improved, declined, or stayed the same* over the last several years. Nearly half of the parties who responded to the question said fishing has remained the same. An additional 27% said fishing had improved, while 24% said it had declined. The responses of lake residents vs. non-lake residents were similar in regards to the percentage that said fishing has stayed the same (50.6% and 49.2% respectively). There was a larger difference between lake residents and non-lake residents in regards to whether fishing was improving or declining at the chain. Only 19% of the lake residents said fishing was improving compared to 30% of the non-lake residents. On the other hand, 30% of the lake residents said fishing was declining while only 21% of non-lake residents gave this response. Among anglers fishing specifically for bass, 22% thought fishing had improved, 16% thought it had declined and 62% thought it had not changed.

Anglers not fishing in a bass tournament were asked two additional questions. First, they were asked if they thought tournament fishing had any affect on fishing at the Lake James Chain. Next, they were asked if tournament fishing affected the Lake James Chain in any other ways.

When asked if tournaments affect fishing, 20% of the respondents replied *yes*, 58% replied *no* and 22% had *no opinion*. Twice the percentage of lake residents (32%) answered yes to this question as non-lake residents (16%). Sixty-one percent of non-lake residents felt tournaments had no affect on fishing compared to 51% of the lake residents. Lake residents and non-lake residents with no opinion to this question comprised 17% and 23% of the survey respondents respectively. Numerous reasons were given by anglers for why they felt tournament fishing affected fishing. The most popular reason given (27%) was that bass numbers were hurt by catching them off the beds. The second most popular reason (24%) was that the bass were not released in the same lake where they were caught. This reason was first among lake residents at 59%. The third most popular reason (16%) was tournaments put too much stress or pressure on bass. This reason was second among lake residents at 29%. No other reasons comprised 10% or more of the responses.

When anglers were asked if tournament fishing affects the Lake James Chain any other way, over half of the anglers (59%) answered no, 18% answered yes and 23% had no opinion. Among those responding yes were 28% of the lake residents and 14% of the non-lake residents. The number one reason given for how tournaments affect the lakes in other ways was they increase boat congestion (22%), followed by discourteous or unsafe boat operations and speed (17%), just too many (12%), and too much early morning noise (12%). The top reason among lake residents was there are just too many tournaments (20%) followed by increased boat congestion and too much early morning noise, both at 17%. Other reasons given were anglers fished too close to piers, docks and swim rafts (13%) and discourteous or unsafe boat operations and speed (11%). The first two reasons listed by non-lake residents were increased boat congestion (26%) followed by discourteous or unsafe boat operations and speed (20%), with their third most popular reason being they tie up state boat ramps (11%).

Bass tournaments

One of the objectives of this project was to estimate fishing pressure and bass catches at the Lake James Chain by tournament anglers. Conventional expansion factors used in the main portion of

this report could not be used to separate fishing pressure by tournament anglers from non-tournament anglers because it was impossible to distinguish between tournament and non-tournament anglers while conducting angler counts throughout the day. Fortunately, the majority of the tournaments launched from the same private boat ramp and the owner kept good records of tournament contacts. In addition, fishing was monitored at all lakes in the chain, on all weekends, which enabled IDFW angler analysts to determine if any tournaments were being conducted from the IDFW public ramps. When a tournament was identified, the name and phone number of the organizer was recorded. This information, along with the information collected from the owner of the private ramp, allowed for follow-up phone calls at the end of the season to collect missing tournament information. This left the weekdays the analysts were not working as the only times it was not possible to track tournaments conducted from one of the state ramps. It is believed that a reasonable estimate of fishing pressure by bass tournament anglers at the Lake James Chain was obtained. An effort was also made to interview as many of the individual tournament fishermen as possible, but congestion and time constraints at the weigh-ins made this difficult. Therefore, the number of bass caught and released by these anglers, that were not brought to the weigh-in, is not complete.

A total of 30 bass tournaments were verified by IDFW personnel as being conducted on the Lake James Chain during the project period. Of these, 70% were organized by Indiana Clubs, 23% by Ohio Clubs and 7% by Michigan Clubs. Nine tournaments were held in May, five each in June and July, seven in August, three in September and one in October. Only two tournaments were held by non-residents during their state's closed bass season. A total of 564 boats competed in bass tournaments on the chain, an average of 19 per tournament. Only nine of the 30 tournaments had more than 15 boats participate. The total number of anglers who fished in these tournaments was 1,069; an average of 37 per tournament. These anglers weighed-in an average of 25 bass per tournament. The average number of bass allowed per boat was 6. Bass tournament anglers fished approximately 8,680 hours, or 13% of the total fishing pressure at the Lake James Chain.

Since it was impossible to calculate expanded numbers for bass fishermen only, a comparison of the un-expanded data from anglers that were interviewed represents the best possible alternative. The angler analyst was unable to observe every bass caught and released, therefore the number reported directly to the analyst by anglers will be used. These bass still will be referred to as “observed” catch and release. A total of 146 tournament angler parties were interviewed. These parties caught and released 1,088 bass. This represents 35% of the observed bass catch and release (3,114 bass). A total of 2,733 bass (88%) were observed caught and released by all anglers fishing specifically for bass. Tournament anglers accounted for 40% of this catch. The observed catch per hour (CPH) for bass by all fisherman was 0.40. However, the observed CPH for non-tournament anglers fishing specifically for bass was twice that at 0.82. This is a slightly higher success rate than that of tournament anglers (0.78).

DISCUSSION

Total fishing pressure at the Lake James Chain during the 2000 survey was 66,771 hours or 34 hours per acre. Pressure of 50 hours per acre is considered low in Indiana. Fishing pressure at Lake James (19 hrs/ac) and Snow Lake (38 hrs/ac) fell short of the statewide average.

Jimmerson and the Otter Lakes both exceeded the average with 64 and 104 hours per acre respectively. Total fishing pressure was recently measured at several medium size Northeast Indiana natural lakes; Big Turkey Lake (450 acres) which lies in both Steuben and LaGrange Counties (Koza 1999), Pretty Lake (184 acres) in LaGrange County (Koza 1996) and Adams Lake (308 acres), also in LaGrange County (Ledet 1992). Fishing pressure at these lakes measured 53, 52, and 37 hours per acre respectively and averaged 47.

Two other Northeast Indiana natural lakes, Wawasee and Syracuse (3,824 acres combined) in Kosciusko County were also recently surveyed (Pearson 1998). These lakes are connected and were treated as one large natural lake. Total fishing pressure at these two lakes was 124,488 hours or 33 hours per acre. This compares favorably with the Lake James Chain average of 34 hours per acre.

Jimmerson Lake experienced the highest total fishing pressure followed by Lake James, Snow Lake and the Otter Lakes. While the Otter Lakes received the lowest total fishing pressure, anglers exerted 30 more hours per acre there than at the next closest lake, Jimmerson. These two lakes were followed by Snow Lake and Lake James.

Anglers fished more during July than any other month. This was followed closely by June, then August. October received the lowest total fishing pressure of all months surveyed, which is typically the case at Indiana natural lakes. Determining monthly fishing pressure trends is difficult due to the variability in monthly pressure from year to year and fishing quality from lake to lake.

The Lake James Chain attracted anglers from 37 Indiana counties as well as Michigan, Ohio and several other states. This chain is obviously a very popular fishing destination, especially when you consider Adams, Pretty and Big Turkey Lakes only drew anglers from 15, 18 and 16 Indiana counties respectively. The percentage of out-of-state anglers fishing the chain included 15% of all interviewed parties. By comparison, the average percentage out-of-state anglers fishing at Adams, Pretty and Big Turkey Lakes was less than half this at only 6%. Overall, Lake James Chain residents comprised the largest percentage of the parties interviewed at 24% followed by Steuben County residents at 21% and Allen County residents at 19%. Lake residents were also first among the parties interviewed at Adams Lake (31%), while they were second at Pretty Lake (18%) but only fourth at Big Turkey Lake (16%).

The overwhelming species of choice among Lake James Chain anglers was largemouth bass, as 43% of the anglers indicated they were pursuing bass that day. Bluegill was a distant second at 19%. Largemouth bass also ranked first at Lake Wawasee and Syracuse Lake, attracting 46% of all anglers. It was also the most sought after species at Big Turkey (58%) and Adams (30%) Lakes but was only third among Pretty Lake anglers (15%) who preferred bluegill more than any other species.

The IDFW worked many years to acquire land on the Lake James Chain to develop a public access site. In 1999, these efforts came to fruition as two new state-owned public access sites were completed. One of the sites is located on Big Otter Lake while the other is on Jimmerson Lake. Both sites enable anglers to have access to all five lakes in the chain. These sites were used by approximately 30% of all angler parties interviewed who had launched a boat the day they were interviewed.

Having access to five lakes for a day of angling was thought to be one of the attractions of the Lake James Chain. Approximately 17% of the angling parties took advantage of this and fished more than one lake during a fishing trip. The large majority of anglers, however, chose to concentrate their efforts on only one lake for the day.

Anglers harvested 46,062 fish weighing 16,739 pounds from the Lake James Chain; a yield of nine pounds of fish per acre. The pounds of fish harvested from the chain falls below the natural lakes average of 22.5 pounds per acre. However, yield from the Lake James Chain was identical to yield at Adams, Pretty and Big Turkey Lakes which was also nine pounds of fish per acre. The Lake James Chain average was pulled down by Lake James where harvest was only four pounds per acre. Yield at the other three lakes in the chain combined averaged 17 pounds per acre, almost double the average for the chain. While James had the lowest harvest in terms of pounds per acre, the Otter Lakes recorded the highest. Despite yielding the most pounds per acre, the Otters were last in total pounds harvested.

Total fish harvest by number was highest at Jimmerson Lake and lowest at the Otter Lakes. This was also true for bluegill and redear harvest. The Otter Lakes were also last in largemouth bass harvest as well as bass catch and release, but led in number of crappie harvested. Lake James was first in largemouth bass harvest and bass catch and release. Snow Lake was second in both number of bass harvested and bass caught and released, followed by Jimmerson Lake which was third in both categories.

Bluegill harvest by number surpassed all other species at the Lake James Chain. In fact, bluegill comprised 83% of the total fish harvest at the chain. Thirteen times as many bluegill were harvested as the next closest species (redeer). October led all months in bluegill harvest despite having the lowest total fishing pressure of any month. Catch per effort for bluegill in October was 1.58 fish per hour, the only month in which it exceeded 1.00. The next closest month was September when the bluegill catch rate was 0.77 per hour.

A total of 46,062 bluegill were harvested from the chain, a yield of 20 per acre. Bluegill harvest at Adams, Pretty and Big Turkey Lakes was 11, 11 and 42 per acre respectively. Bluegill yield at Indiana natural lakes, on average, is 30 per acre. Despite having the lowest total bluegill harvest, the Otter Lakes led all lakes in the chain in bluegill harvest per acre, surpassing the next closest lake, Jimmerson, by 24 per acre. James had the lowest harvest in terms of number per acre at nine. Jimmerson led in total bluegill harvest but was only third in catch per hour. Snow Lake led all lakes in catch per hour with Lake James once again being last.

Largemouth bass harvest was very low at the Lake James Chain, reflecting the current popularity of catch and release fishing. Only 2% of all the largemouth caught were kept by anglers. Forty-five times as many bass were released as were kept. Anglers at Big Turkey lake caught and released 9,750 largemouth bass in 1998 while keeping 396 (4%). In addition, Lake Wawasee and Syracuse Lake anglers caught and released 31,672 largemouth in 1997 but kept 6,710 (18%). The overall largemouth bass catch rate at the Lake James Chain was 0.39 per hour while bass were caught at Big Turkey Lake at a rate of 0.43 per hour and Wawasee and Syracuse Lakes at 0.30 per hour. All of these rates are substantially higher than the average bass catch rate of 0.14 fish per hour recorded from creel surveys conducted between 1972 and 1994. Average bass harvest from these lakes, during this same time period, was two fish per acre and 0.03 per hour. Bass harvest at the Lake James Chain pales in comparison at only 0.3 fish per acre and 0.01 fish per hour. Clearly, harvest is not hurting the bass populations at the Lake James Chain. In fact, the highest number of largemouth bass kept by any angling party was four. There were two anglers in this party, for an average harvest of only two bass per angler.

Redear, black crappie and yellow perch ranked second, third and fourth in harvest respectively. The combined harvest of these three species contributed only 13% of the total fish harvest at the chain but they were still present in numbers and sizes attractive to anglers. Some northern pike were harvested but large pike were noticeably absent from the creel. Both Lake James and Snow Lake have good reputations among ice fishermen for pike fishing and large pike are routinely caught through the ice at these lakes. Smallmouth bass also provide fishing opportunities at the chain although they are primarily limited to Lake James. Harvest of smallmouth bass was small but almost 1,300 were caught and released.

Tournament fishing is a controversial issue in Indiana, especially bass tournaments in the natural lakes region. Common complaints about bass tournaments include too many out-of-state anglers fishing Indiana waters while their bass seasons are closed, overcrowding of public access sites and the lakes themselves, and the negative effects on bass populations due to handling and weigh-in mortality.

Anglers fished in 30 tournaments at Lake James in 2000, and of these, only nine were organized by out-of-state anglers. In addition, only two of these took place during the closed bass season in their respective state.

In addressing overcrowding or user conflicts at access sites, it is interesting to note that the total number of tournament boats counted during this study was 564 and only 12% of these launched at a public access site. The average number of boats on the water during a tournament was 19 and only nine tournaments had over 15 boats participating. In addition, only 13% of the total fishing pressure on the chain was from the 1,096 bass tournament anglers. At Lake Wawasee and Syracuse Lake in 1997, 3,480 tournament anglers fished 28,540 hours which represented 23% of the total fishing pressure. Tournaments there drew an average of 62 boats per event.

The average number of bass weighed-in at the 30 tournaments held on the Lake James Chain was 25. According to bass population estimates at the Lake James Chain, even if 100% mortality

occurred among the weighed-in fish, the tournament exploitation rate of bass 14 inches in length or larger would only be 25% ($30 \times 25/3019$). Typically, bass can withstand 35% exploitation and still maintain quality populations. Taking into account the non-tournament exploitation of largemouth bass observed during the creel survey (570), a 65% mortality rate for fish weighed-in during tournaments would be necessary to reach the 35% threshold limit. Based on observations at multiple tournament weigh-ins at Indiana lakes, the likelihood of 65% post weigh-in mortality occurring is small. At this time, it does not appear that tournaments are having a negative effect on bass populations at the Lake James Chain.

The success rate for tournament bass fishermen was similar to that achieved by all bass anglers at the chain. Overall, Lake James Chain anglers caught largemouth bass at a rate of 0.38 per hour. Tournament bass anglers caught bass at a rate 0.78 fish per hour while non-tournament anglers targeting bass had a success rate 0.82 fish per hour. Tournament and non-tournament bass anglers at Big Turkey Lake in 1999 caught bass at a rate 0.77 and 0.65 per hour respectively.

One of the biggest complaints about bass tournaments is the perception that they hurt fishing. Among anglers interviewed at Lake Wawasee, 28% indicated they thought tournaments hurt fishing. This is similar to the responses received during the 1994 statewide angler survey (Shipman 1995) in which 27% thought tournaments hurt fishing. Only 20% of the Lake James Chain anglers interviewed thought fishing was hurt by tournaments. Not surprisingly, a higher percentage of lake residents (32%) saw this as a problem than non-lake residents (16%). Similarly, more lake residents (28%) thought tournaments affected the lakes in other ways than non-lake residents (14%). Eighteen percent of the creel survey respondents cited congestion, rude and discourteous behavior, noise and safety concerns as ways tournaments affect the lakes. In all, approximately 11% more respondents opposed fishing tournaments based on biological reasons than social reasons.

BASS POPULATION ESTIMATES

METHODS AND MATERIALS

IDFW fisheries biologists conducted bass population estimates on the lakes of the Lake James Chain in the spring of 2000. This marks the first time bass population estimates were done on these lakes. Sampling consisted of nighttime DC electrofishing with three person crews; two “fish dippers” and a boat driver. Over the course of the survey, twenty-seven persons participated in bass collection. Sampling effort varied from lake to lake depending on size and miles of shoreline. Jimmerson, Snow and Big and Little Otter Lakes were sampled one night a week for four consecutive weeks. Lake James was sampled two nights a week for four consecutive weeks. It was necessary to sample Lake James twice a week in order to cover the entire shoreline each week. Two electrofishing crews sampled Lake James each night. Three crews were on Jimmerson Lake and Snow Lake each night for the first two weeks and two crews were used each night for each of the last two weeks. Only one crew was used each night at Big and Little Otter Lakes. Because of their close proximity and size, Big and Little Otter Lakes were sampled together and treated as one lake.

Largemouth and smallmouth bass were collected during the population estimates and each species was recorded separately. Each bass was measured for length and marked by removing a fin. A different fin was removed from bass at each lake to determine if movement between lakes was occurring and to insure that only bass previously captured at a specific lake were included in that lakes population estimate. The total number of bass collected was recorded and population estimates, based on the number of marked fish that were re-captured, were made using the Schnabel method.

RESULTS and DISCUSSION

Total electrofishing time at the chain was 83 hours; 35 hours on James, 20 hours on Jimmerson, 19 hours on Snow and nine hours on the Otter Lakes. The result was the collection of 4,329 largemouth bass from Lake James, 1,937 from Jimmerson Lake, 2,479 from Snow Lake and

1,037 from the Otter Lakes for a total of 9,782. In addition, 563 smallmouth bass were collected from Lake James. Very little migration of bass occurred between the lakes in the chain during the four week sampling period. Only four bass were collected that had marks indicating they were originally captured in a different lake.

The largemouth bass population estimate for the entire Lake James Chain was 33,517 or 17 bass per acre (Table 54). Biologists, therefore, captured and marked approximately 29% of all bass in the chain during this study. The population estimate of largemouth bass in Lake James was 13,651 fish. Snow lake had the second largest estimated population at 8,812 bass, followed closely by Jimmerson Lake with 8,276. The Otters were last at 2,778 bass. These population estimates had standard errors ranging from 4% at Lake James to 7% at Jimmerson Lake and the Otters. The sampling objective, when conducting population estimates, is to have standard errors of 10% or less. All of the population estimates included in this study met this objective.

When comparing bass populations, similar length groups should be used. One commonly used length group is termed "stock size". Stock size for largemouth bass is any fish eight inches in length or larger. Estimates indicate 26,365 stock size bass were present in the waters of the Lake James Chain (Table 55). Of these, 3,109 were 14 inches in length or larger and 485 were 18 inches or larger.

A 12 inch minimum size limit was imposed on largemouth bass harvest in Indiana in 1990. This was increased to 14 inches in the fall of 1998. Much more data is available on Indiana bass populations prior to these size limits than after. Therefore, bass population data collected prior to imposition of the size limits will be used for comparisons in this report. Largemouth bass population information was collected at 13 large and 21 medium size natural lakes (Table 56) prior to the 12 inch size limit (Pearson 1996). A large natural lake is one greater than 500 acres while a medium size natural lake is 100 to 499 acres in size.

The population of stock size bass at Lake James was estimated at 10,031 fish with a standard

error of 4%. Bass 8-11.5 inches comprised 74% of the stock size fish population compared to 77%, the average for large natural lakes in Indiana prior to the size limit. Largemouth bass 12-13.5 inches, 14-17.5 inches and >18 inches comprised 19%, 6% and 0.7% of the stock size bass population in Lake James respectively. Averages for these size groups in pre-size limit lakes were 14%, 8% and 2% respectively.

The average density of stock size bass at pre-size limit large natural lakes is 8.5 per acre. The stock size bass population in Lake James was estimated at 8.9 fish per acre (Table 57), a slight increase of 5%. The number of 12 inch in length or larger bass per acre also increased slightly from an average of 2.0 prior to the size limit to 2.3 presently. The pre-size limit average per acre for bass 14 and 18 inches in length or larger was 0.8 and 0.2 respectively. The estimate of Lake James largemouth bass in these two size groups was 0.6 and 0.1 respectively, both slightly lower than pre-size limit levels. Overall, it appears Lake James' largemouth bass have shown little response to the size limit regulations. One reason for this lack of response may be related to total fishing pressure. Typically, fishing pressure per acre is low on large lakes, along with harvest and yield. Therefore, any changes in harvest due to size limit regulations or changes in angler attitudes (catch and release) would be smaller and the resulting impacts on fish populations less.

The other three lakes sampled, Jimmerson, Snow and the Otters, fall into the medium size category. Snow ranked first in the estimated number of stock size bass (7,187), followed by Jimmerson (6,099) and the Otters (2,418). The standard errors for these estimates were 6%, 8% and 8% respectively. The majority of the stock size bass in Snow, Jimmerson and the Otters were in the 8-11.5 inch range, comprising 61%, 60% and 55% of the stock size populations respectively. The average for stock size fish in the 8-11.5 inch size range at pre-size limit, medium size natural lakes, was 73%. For largemouth bass 12-13.5 inches in length, the populations make-ups were very similar between Snow, Jimmerson and the Otters. Snow Lake had the highest percentage of bass in this size range (26%) followed by Jimmerson (25%) and the Otters (25%). In the pre-size limit lakes, only 12% of the stock size bass were in this size range. The Otter Lakes had a higher percentage of stock size bass in the 14-17.5 inch range (16%) than

Jimmerson (12%) or Snow (11%). Bass in this size range at the pre-size limit lakes averaged 12%. Eighteen inch and larger bass comprised 4% of the stock size bass at the Otters, 3% at Jimmerson and 2% at Snow. The pre-size limit average was 3%.

Clearly, the largest shift in bass populations at these three lakes occurred in the 8-11.5 inch and 12-13.5 inch size ranges. The percentage of bass in the former size group changed from 73% at the pre-size limit lakes to an average of 59% for Snow, Jimmerson and the Otters, a decrease of 14 percentage points. Changes also occurred in the 12-13.5 inch size group. The percentage of bass in this size group was 12% at the pre-size limit lakes. Bass in the 12-13.5 size range averaged 26% at Snow, Jimmerson and the Otters, an increase of 14 percentage points. In addition, the percentage of stock size bass in the 14-17.5 inch range was 12% at the pre-size limit lakes. At Snow, Jimmerson and the Otters, this size group averaged 13% of the population.

The Otter Lakes ranked first in the number of stock size bass per acre at 24, followed by Snow Lake at 21 and Jimmerson Lake at 17. The average number of stock size bass at pre-size limit lakes was 11 per acre. All lakes in the Lake James Chain exceeded this number with the Otters more than doubling it. This included a 50% increase in stock size bass in Jimmerson, 88% increase in Snow and 106% increase in the Otters. All of the lakes also exceeded the average for 12 inch and larger bass of 3 per acre. The Otters also led in this category at 11, followed by Snow at 8 and Jimmerson at 7. Likewise, for bass 14 inches in length and larger all of the lakes had more bass per acre than the natural lakes average (2/acre). The Otters were again first (5/acre) followed by Snow (3/acre) and Jimmerson (3/acre). Of the three medium size lakes, Jimmerson, Snow and the Otters, the Otters were the only ones that had a significantly higher number of 18 inch and larger bass per acre than the natural lakes average. The 0.9 bass per acre at the Otters was more than twice the average (0.4/acre). Jimmerson and Snow Lakes were close to the natural lakes average at 0.5 and 0.4 bass per acre respectively.

Electrofishing catch rates (number/hour) of stock size bass were also higher for all lakes in the

chain compared to pre-size limit averages. The average catch rate of stock size bass at pre-size limit, large and medium lakes, was 73 and 64 bass per hour respectively. The catch rate of stock size bass at Lake James in 2000 was 117/hour, an increase of 60%. The catch per hour at Snow Lake, the Otters and Jimmerson Lake was 137, 121 and 89 respectively. These represent increases of 114%, 89% and 39% respectively.

In addition to the largemouth bass population estimate at Lake James, enough smallmouth bass were captured, marked and re-captured to calculate a population estimate. The estimate for smallmouth bass was 1,669 fish with a standard error of 11%. The largest smallmouth bass collected from Lake James was 19.5 inches in length. Two smallmouth bass were also collected at Snow Lake and 12 were collected at Jimmerson Lake. The largest of these was a 18.5 inch fish from Jimmerson.

PROJECT SUMMARY

The Lake James Chain provides good sport fishing opportunities dominated by largemouth bass and bluegill. Forty-three percent of the anglers fished specifically for bass followed by bluegill anglers who represented 19% of the sample. Total fishing pressure on the chain, 34 hours per acre, is considered low. The highest number of angler hours per acre was observed on the Otter lakes. Anglers from 37 Indiana counties were interviewed. Steuben County and lake residents represented 45% of the anglers interviewed. Less than 15% of the anglers were non-residents.

A total of 38,000 bluegill were harvested from the chain. They were harvested at a rate of 20 per acre ranging from 9 per acre on Lake James to 62 per acre on the Otters. The average number of bluegill harvested per acre from northern Indiana natural lakes is 30. The average size of bluegill harvested was 7.3 inches. Eight inch and larger bluegill comprised 31% of the harvest while nine and ten in fish contributed 11% and 3% respectively.

The Lake James Chain largemouth bass populations are deemed healthy based on density, size

structure, growth rates and presence of multiple year classes. Based on the average number of bass present in the study lakes prior to the 12 inch minimum size limit, the number and size of bass in the chain has increased considerably. The minimum size limit coupled with the growing popularity of catch and release fishing are both considered contributing factors. The total harvest of 570 largemouth bass from the chain was relatively small but the catch and release of 25,663 largemouth bass was significant. Over forty-five times as many bass were caught and released as harvested. Redear, black crappie, yellow perch, rock bass, smallmouth bass and northern pike also contributed to the fishery.

Bass tournaments were popular on the chain. However, they only comprised 13% of the total fishing pressure. The Lake James Chain appears to attract small, local club tournaments, compared to the larger events documented at Lake Wawasee. Of the 30 bass tournaments held on the Lake James Chain in 2000, nine were organized by non-residents. The majority of non-tournament anglers interviewed on the chain did not believe tournaments hurt fishing or negatively affected the lake. The justification to regulate fishing tournaments on the Lake James Chain is less than clear. One possible social reason involves boat congestion at or near launch sites during tournament weigh-ins.

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Table 1. Summary of total fishing pressure and harvest of major fish species at the Lake James Chain, 2000.

	Jimmerson	James	Snow	Otters	Total
Total Fishing Pressure (hrs.)	23,007	19,193	13,884	10,687	66,771
Hours/acre	64	17	38	104	34
Total harvest	16,407	9,983	11,607	8,002	46,062
Bluegill	13,575	8,245	10,188	6,384	38,392
Redear	1,942	397	508	39	2,886
Crappie	39	372	218	1,538	2,167
Largemouth bass	169	198	167	36	570
Smallmouth bass		47			47
<u>Catch & Release</u>					
Largemouth bass	8,128	8,147	6,152	3,236	25,663
Smallmouth bass	234	846	209	2	1,291

Table 2. Monthly fishing pressure and harvest from the Lake James Chain, May - October, 2000.

Species	May	June	July	August	September	October	Total
Bluegill	3,047	7,985	4,222	7,740	6,534	8,864	38,392
Redear	386	1,073	533	316	95	483	2,886
Black crappie	481	163	560	866	40	57	2,167
Yellow perch	139	206	196	259	246	60	1,106
Largemouth bass	100	195	170	42	63		570
Rock bass	185	211	64	76	16		552
Warmouth		145	25		45		215
Northern pike		6	24	23	34		87
Smallmouth bass	7	17	19	4			47
Bullheads		9	21				30
Pumpkinseed			10				10
Total	4,345	10,010	5,844	9,326	7,073	9,464	46,062
Angler hours	11,276.22	14,207.80	14,549.44	12,668.30	8,457.34	5,611.63	66,770.73
Hours per acre	5.77	7.27	7.45	6.49	4.33	2.87	34.19
Fish per hour	0.39	0.70	0.40	0.74	0.84	1.69	0.69

Table 3. Monthly fishing pressure and harvest from Lake James, May - October, 2000.

Species	May	June	July	August	September	October	Total
Bluegill	206	2,645	406	1,185	432	3,371	8,245
Redear	30	254		4	23	86	397
Black crappie	155	54	13	150			372
Rock bass	140	188		11			339
Yellow perch	40	24		60	114	19	257
Largemouth bass	33	71	44	22	28		198
Northern pike			12	23	34		69
Smallmouth bass	7	17	19	4			47
Warmouth			25		21		46
Bullheads			13				13
Total	611	3,253	532	1,459	652	3,476	9,983
Angler hours	3,531.27	3,393.14	4,520.62	3,701.54	2,283.08	1,763.43	19,193.08
Hours per acre	3.42	3.28	4.37	3.58	2.21	1.71	18.56
Fish per hour	0.17	0.96	0.12	0.39	0.29	1.97	0.52

Table 4. Monthly fishing pressure and harvest from the Otter Lakes, May - October, 2000.

Species	May	June	July	August	September	October	Total
Bluegill	102	206	712	2,894	2,049	421	6,384
Black crappie	247	68	530	666		27	1,538
Redear				39			39
Largemouth bass	11		25				36
Yellow perch		5					5
Total	360	279	1,267	3,599	2,049	448	8,002
Angler hours	1,040.00	1,901.33	2,413.87	2,784.89	1,880.00	667.20	10,687.29
Hours per acre	10.10	18.46	23.44	27.04	18.25	6.48	103.76
Fish per hour	0.35	0.15	0.52	1.29	1.09	0.67	0.75

Table 5. Monthly fishing pressure and harvest from Jimmerson Lake, May - October, 2000.

Species	May	June	July	August	September	October	Total
Bluegill	2,403	3,100	1,953	1,478	2,088	2,553	13,575
Redear	277	748	469	177	72	199	1,942
Yellow perch	46	146	164	76	43		475
Largemouth bass	36	56	55	20	2		169
Rock bass	45	23	46	18	16		148
Black crappie	26			8	5		39
Warmouth					24		24
Bullheads		9	8				17
Pumpkinseed			10				10
Northern pike			8				8
Total	2,833	4,082	2,713	1,777	2,250	2,752	16,407
Angler hours	4,324.00	5,433.33	5,388.73	4,328.00	1,990.26	1,542.40	23,006.72
Hours per acre	12.11	15.22	15.09	12.12	5.57	4.32	64.44
Fish per hour	0.66	0.75	0.50	0.41	1.13	1.78	0.71

Table 6. Monthly fishing pressure and harvest from Snow Lake, May - October, 2000.

Species	May	June	July	August	September	October	Total
Bluegill	336	2,034	1,151	2,183	1,965	2,519	10,188
Redear	79	71	64	96		198	508
Yellow perch	53	31	32	123	89	41	369
Black crappie	53	41	17	42	35	30	218
Largemouth bass	20	68	46		33		167
Warmouth		145					145
Rock bass			18	47			65
Northern pike		6	4				10
Total	541	2,396	1,332	2,491	2,122	2,788	11,670
Angler hours	2,380.95	3,480.00	2,226.22	1,853.87	2,304.00	1,638.60	13,883.64
Hours per acre	6.51	9.51	6.08	5.07	6.30	4.48	37.94
Fish per hour	0.23	0.69	0.60	1.34	0.92	1.70	0.84

Table 7. Fishing pressure, harvest and yield from the Lake James Chain, 2000.

Species	Number Harvested	Percent	Total Weight (lbs.)	Percent
Bluegill	38,392	83.3	12,191.61	72.8
Redear	2,886	6.3	1,598.25	9.5
Black crappie	2,167	4.7	835.01	5.0
Yellow perch	1,106	2.4	337.89	2.0
Largemouth bass	570	1.2	1,098.69	6.6
Rock bass	552	1.2	256.31	1.5
Warmouth	215	0.5	54.88	0.3
Northern pike	87	0.2	244.60	1.5
Smallmouth bass	47	0.1	85.26	0.5
Bullheads	30	0.1	33.98	0.2
Pumpkinseed	10	0.1	2.04	0.1
Total	46,038		16,738.52	

Total angler hours - 66,770.73

Total angler hours per acre - 34.19

Total pounds harvested per acre - 8.57

Fish harvested per hour - 0.69

Table 8. Fishing pressure, harvest and yield from Jimmerson Lake, 2000.

Species	Number Harvested	Percent	Total Weight (lbs.)	Percent
Bluegill	13,575	82.7	4,062.59	71.4
Redear	1,942	11.8	1,043.53	18.3
Yellow perch	475	2.9	79.96	1.4
Largemouth bass	169	1.0	344.35	6.1
Rock bass	148	0.9	72.09	1.3
Black crappie	39	0.2	21.13	0.4
Warmouth	24	0.1	6.13	0.1
Bullheads	17	0.1	26.09	0.5
Pumpkinseed	10	0.1	2.04	0.1
Northern pike	8	0.1	33.44	0.6
Total	16,407		5,691.35	

Total angler hours - 23,006.72

Total angler hours per acre - 64.44

Total pounds harvested per acre - 15.94

Fish harvested per hour - 0.71

Table 9. Fishing pressure, harvest and yield from Snow Lake, 2000.

Species	Number Harvested	Percent	Total Weight (lbs.)	Percent
Bluegill	10,188	87.3	3,407.02	77.8
Redear	508	4.4	298.83	6.8
Yellow perch	369	3.2	116.68	2.7
Black crappie	218	1.9	136.07	3.1
Largemouth bass	167	1.4	317.87	7.3
Warmouth	145	1.2	37.01	0.8
Rock bass	65	0.6	29.15	0.7
Northern pike	10	0.1	34.81	0.8
Total	11,670		4,377.44	

Total angler hours - 13,883.64

Total angler hours per acre - 37.94

Total pounds harvested per acre - 11.96

Fish harvested per hour - 0.84

Table 10. Fishing pressure, harvest and yield from Lake James, 2000.

Species	Number Harvested	Percent	Total Weight (lbs.)	Percent
Bluegill	8,245	82.6	2,877.91	68.7
Redear	397	4.0	234.21	5.6
Black crappie	372	3.7	139.71	3.3
Rock bass	339	3.4	155.07	3.7
Yellow perch	257	2.6	140.12	3.3
Largemouth bass	198	2.0	358.02	8.6
Northern pike	69	0.7	176.35	4.2
Smallmouth bass	47	0.5	85.26	2.0
Warmouth	46	0.5	11.74	0.3
Bullheads	13	0.1	7.89	0.2
Total	9,983		4,186.28	

Total angler hours - 19,193.08

Total angler hours per acre - 18.56

Total pounds harvested per acre - 3.71

Fish harvested per hour - 0.52

Table 11. Fishing pressure, harvest and yield from the Otter Lakes, 2000

Species	Number Harvested	Percent	Total Weight (lbs.)	Percent
Bluegill	6,384	79.8	1,844.09	74.4
Black crappie	1,538	19.2	538.10	21.7
Redear	39	0.5	21.68	0.6
Largemouth bass	36	0.4	78.45	3.2
Yellow perch	5	0.1	1.13	0.1
Total	8,002		2,483.45	

Total angler hours - 10,687.29

Total angler hours per acre - 103.76

Total pounds harvested per acre - 24.11

Fish harvested per hour - 0.75

Table 12. Length-frequency distribution for bluegill harvested from the Lake James Chain, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
5.0	208	0.5	19.00	0.2
5.5	1,285	3.3	157.26	1.3
6.0	4,232	11.0	676.37	5.5
6.5	6,854	17.9	1,400.31	11.5
7.0	7,592	19.6	1,930.86	15.8
7.5	6,286	16.4	1,992.08	16.3
8.0	4,989	13.0	1,927.21	15.8
8.5	2,726	7.1	1,268.27	10.4
9.0	2,088	5.4	1,157.62	9.5
9.5	1,107	2.9	724.46	5.9
10.0	585	1.5	448.09	3.7
10.5	343	0.9	305.14	2.5
11.0	62	0.2	63.62	0.5
11.5	61	0.2	71.74	0.6
12.0	37	0.1	49.58	0.4
Total	38,392		12,191.61	

Table 13. Length-frequency distribution for redear harvested from the Lake James Chain, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
5.5	10	0.3	1.23	0.1
6.0	30	1.0	4.79	0.3
6.5	57	2.0	11.58	0.7
7.0	158	5.5	40.09	2.5
7.5	179	6.2	55.88	3.5
8.0	370	12.8	140.22	8.8
8.5	393	13.6	178.68	11.2
9.0	629	21.8	339.55	21.2
9.5	369	12.8	234.32	14.7
10.0	386	12.4	285.94	17.9
10.5	164	5.7	140.66	8.8
11.0	53	1.8	52.28	3.3
11.5	23	0.8	25.93	1.6
12.0	42	1.5	53.80	3.4
12.5	23	0.8	33.30	2.1
Total	2,886		1,598.25	

Table 14. Length-frequency distribution for black crappie harvested from the Lake James Chain, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
6.0	35	1.6	4.01	0.5
6.5	93	4.3	13.56	1.6
7.0	323	14.9	58.88	7.1
7.5	213	9.8	47.79	5.7
8.0	290	13.4	79.02	9.5
8.5	118	5.4	38.59	4.6
9.0	194	9.0	75.36	9.0
9.5	288	13.3	131.64	15.8
10.0	254	11.7	135.49	16.2
10.5	225	10.4	139.01	16.6
11.0	52	2.4	36.96	4.4
11.5	34	1.6	27.62	3.3
12.0	41	1.9	37.86	4.5
13.5	7	0.3	9.22	1.1
Total	2,167		835.01	

Table 15. Length-frequency distribution for yellow perch harvested from the Lake James Chain, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
5.5	43	3.9	3.27	1.0
6.0	72	6.5	7.25	2.1
6.5	155	14.0	20.20	6.0
7.0	125	11.3	20.68	6.1
7.5	138	12.5	28.51	8.4
8.0	133	12.0	33.83	10.0
8.5	64	5.8	19.79	5.9
9.0	126	11.4	46.82	13.9
9.5	46	4.2	20.34	6.0
10.0	63	5.7	32.87	9.7
10.5	54	4.9	32.96	9.8
11.0	16	1.4	11.35	3.4
11.5	55	5.0	45.00	13.3
12.0	16	1.4	15.01	4.4
Total	1,106		337.89	

Table 16. Length-frequency distribution for largemouth bass harvested from the Lake James Chain, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
11.0	6	1.1	3.94	0.4
14.0	136	23.9	186.29	17.0
14.5	121	21.2	184.47	16.8
15.0	100	17.5	169.07	15.4
15.5	41	7.2	76.61	7.0
16.0	67	11.8	137.92	12.6
16.5	15	2.6	33.92	3.1
17.0	23	4.0	56.96	5.2
17.5	8	1.4	21.64	2.0
18.0	6	1.1	17.69	1.6
18.5	8	1.4	25.64	2.3
20.0	14	2.5	56.92	5.2
21.0	14	2.5	66.06	6.0
21.5	6	1.1	30.42	2.8
23.0	5	0.9	31.14	2.8
Total	570		1,098.69	

Table 17. Length-frequency distribution for rock bass harvested from the Lake James Chain, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
6.5	32	5.8	6.50	2.5
7.0	32	5.8	8.12	3.2
7.5	44	8.0	13.74	5.4
8.0	148	26.8	56.09	21.9
8.5	74	13.4	33.64	13.1
9.0	123	22.3	66.40	25.9
9.5	32	5.8	20.32	7.9
10.0	51	9.2	37.78	14.7
10.5	16	2.9	13.72	5.4
Total	552		256.31	

Table 18. Length-frequency distribution for northern pike harvested from the Lake James Chain, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
21.0	21	24.1	42.28	17.3
22.5	21	24.1	52.51	21.5
23.5	13	14.9	37.26	15.2
24.0	7	8.0	21.44	8.8
24.5	7	8.0	22.87	9.3
25.0	10	11.5	34.81	14.2
26.5	8	9.2	33.44	13.7
Total	87		244.60	

Table 19. Length-frequency distribution for smallmouth bass harvested from the Lake James Chain, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
13.5	5	10.6	6.13	7.2
14.0	17	36.1	23.28	27.3
14.5	5	10.6	7.62	8.9
15.0	5	10.6	8.45	9.9
16.0	5	10.6	10.29	12.1
18.0	10	21.3	29.48	34.6
Total	47		85.26	

Table 20. Number of bass and northern pike caught and released at the Lake James Chain, 2000.

Species	Number Released
Largemouth bass	25,663
Smallmouth bass	1,291
Northern pike	231
Total	27,185

Table 21. Species, number and weight of additional fish harvested from the Lake James Chain, 2000.

Species	Number Harvested	Total Weight (lbs.)
Warmouth	215	54.88

Bullheads	30	33.98
Pumpkinseed	10	2.04
Total	255	90.90

Table 22. Length-frequency distribution for bluegill harvested from Lake James, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
5.5	206	2.5	25.21	0.9
6.0	707	8.6	113.00	3.9
6.5	1,106	13.4	225.96	7.9
7.0	1,544	18.7	395.97	13.8
7.5	1,286	15.6	407.54	14.2
8.0	1,351	16.4	521.8	18.1
8.5	630	7.6	293.11	10.2
9.0	733	8.9	406.39	14.1
9.5	386	4.7	252.61	8.8
10.0	219	2.7	167.75	5.8
10.5	77	0.9	68.50	2.4
Total	8,245		2,877.91	

Table 23. Length-frequency distribution for redear harvested from Lake James, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
6.5	25	6.3	5.08	2.2
8.0	50	12.6	18.95	8.1
8.5	50	12.6	22.73	9.7
9.0	74	18.6	39.95	17.1
9.5	74	18.6	46.99	20.1
10.0	50	12.6	37.04	15.8

10.5	74	18.6	63.47	27.1
Total	397		234.21	

Table 24. Length-frequency distribution for black crappie harvested from Lake James, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
6.0	8	2.2	0.92	0.7
6.5	26	7.0	3.79	2.7
7.0	42	11.3	7.66	5.5
7.5	26	7.0	5.83	4.2
8.0	76	20.4	20.71	14.8
8.5	17	4.6	5.56	4.0
9.0	34	9.1	13.21	9.5
9.5	42	11.3	19.20	13.7
10.0	51	13.7	27.20	19.5
10.5	26	7.0	16.06	11.5
11.0	8	2.2	5.69	4.1
11.5	8	2.2	6.50	4.7
12.0	8	2.2	7.39	5.3
Total	372		139.71	

Table 25. Length-frequency distribution for rock bass harvested from Lake James, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
6.5	32	9.4	6.50	4.2
7.5	32	9.4	9.99	6.4
8.0	97	28.6	36.76	23.7
8.5	48	14.2	21.82	14.1
9.0	82	24.2	44.27	28.5
9.5	16	4.7	10.16	6.6
10.0	16	4.7	11.85	7.6
10.5	16	4.7	13.72	8.8
Total	339		155.07	

Table 26. Length-frequency distribution for yellow perch harvested from Lake James, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
7.0	16	6.2	2.65	1.9
8.0	8	3.1	2.03	1.5
9.0	39	15.2	14.49	10.3
9.5	46	17.9	20.34	14.5
10.0	31	12.1	16.17	11.5
10.5	46	17.9	28.08	20.0
11.0	16	6.2	11.35	8.1
11.5	55	21.4	45.00	32.1
Total	257		140.12	

Table 27. Length-frequency distribution for largemouth bass harvested from Lake James, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
14.0	69	34.8	94.52	26.4
14.5	37	18.7	56.41	15.8
15.0	37	18.7	62.55	17.5
15.5	8	4.0	14.95	4.2
16.0	8	4.0	16.47	4.6
16.5	15	7.6	33.92	9.5
17.0	8	4.0	19.81	5.5
17.5	8	4.0	21.64	6.0
21.0	8	4.0	37.75	10.5
Total	198		78.46	

Table 28. Length-frequency distribution for northern pike harvested from Lake James, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
21.0	21	30.4	42.28	24
22.5	21	30.4	52.51	29.8
23.5	13	18.8	37.26	21.1
24.0	7	10.1	21.44	12.2
24.5	7	10.1	22.87	13.0
Total	69		176.35	

Table 29. Length-frequency distribution for smallmouth bass harvested from Lake James, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
13.5	5	10.6	6.13	7.2
14.0	17	36.1	23.28	27.3
14.5	5	10.6	7.62	8.9
15.0	5	10.6	8.45	9.9
16.0	5	10.6	10.29	12.1
18.0	10	21.3	29.48	34.6
Total	47		85.26	

Table 30. Number of bass and northern pike caught and released at Lake James, 2000.

Species	Number Released
Largemouth bass	8,147
Smallmouth bass	846
Northern pike	157
Total	9,150

Table 31. Species, number and weight of additional fish harvested from Lake James, 2000.

Species	Number Harvested	Total Weight (lbs.)
Warmouth	46	11.74
Bullheads	13	7.89
Total	59	19.63

Table 32. Length-frequency distribution for bluegill harvested from Snow Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
5.5	124	1.2	15.18	0.4
6.0	869	8.5	138.89	4.1
6.5	1,688	16.6	344.87	10.1
7.0	2,233	21.9	572.67	16.8
7.5	1,886	18.5	597.69	17.5
8.0	1,303	12.8	503.34	14.8
8.5	881	8.6	409.88	12.0
9.0	447	4.4	247.82	7.3
9.5	360	3.5	235.60	6.9
10.0	211	2.1	161.62	4.7
10.5	124	1.2	110.31	3.2
11.0	25	0.2	25.65	0.8
11.5	37	0.4	43.51	1.3
Total	10,188		3,407.02	

Table 33. Length-frequency distribution for redear harvested from Snow Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
5.5	10	2.0	1.23	0.4
6.0	30	5.9	4.79	1.6
6.5	20	3.9	4.06	1.4
7.0	20	3.9	5.08	1.7
7.5	52	10.2	16.23	5.4
8.0	20	3.9	7.58	2.5
8.5	30	5.9	13.64	4.6
9.0	92	18.1	49.66	16.6
9.5	51	10.0	32.39	10.8
10.0	92	18.1	68.15	22.8
10.5	20	3.9	17.15	5.7
11.0	41	8.1	40.44	13.5
12.0	30	5.9	38.43	12.9
Total	508		298.83	

Table 34. Length-frequency distribution for yellow perch harvested from Snow Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
6.0	8	2.2	0.81	0.7
6.5	24	6.5	3.13	2.7
7.0	32	8.7	5.29	4.5
7.5	73	19.8	15.08	12.9
8.0	48	13.0	12.21	10.5
8.5	64	17.3	19.79	17.0
9.0	64	17.3	23.78	20.4
10.0	32	8.7	16.69	14.3
10.5	8	2.2	4.88	4.2
12.0	16	4.3	15.01	12.9
Total	369		116.68	

Table 35. Length-frequency distribution for black crappie harvested from Snow Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
8.5	7	3.2	2.29	1.7
9.0	13	6.0	5.05	3.7
9.5	40	18.3	18.28	13.4
10.0	46	21.1	24.54	18.0
10.5	52	24.9	32.13	23.6
11.0	7	3.2	4.97	3.7
11.5	26	11.9	21.12	15.5
12.0	20	9.2	18.47	13.6
13.5	7	3.2	9.22	6.8
Total	218		136.07	

Table 36. Length-frequency distribution for largemouth bass harvested from Snow Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
14.0	38	22.8	52.05	16.4
14.5	38	22.8	57.93	18.2
15.0	22	13.2	37.19	11.7
15.5	15	9.0	28.03	8.8
16.0	23	13.8	47.35	14.9
17.0	15	9.0	37.15	11.7
18.5	8	4.8	25.64	8.1
20.0	8	4.8	32.53	10.2
Total	167		317.87	

Table 37. Length-frequency distribution for rock bass harvested from Snow Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
7.0	13	20.0	3.30	11.3
7.5	12	18.5	3.75	12.9
8.0	6	9.2	2.27	7.8
8.5	7	10.8	3.18	10.9
9.0	13	20.0	7.02	24.1
9.5	7	10.8	4.45	15.2
10.0	7	10.8	5.19	17.8
Total	65		29.15	

Table 38. Number of bass and northern pike caught and released at Snow Lake, 2000.

Species	Number Released
Largemouth bass	6,152
Smallmouth bass	209
Northern pike	48
Total	6,409

Table 39. Length-frequency distribution for bluegill harvested from Jimmerson Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
5.0	208	1.5	19.00	0.5
5.5	796	5.9	97.42	2.4
6.0	1,922	14.2	307.18	7.6
6.5	2,851	21.0	582.48	14.3
7.0	2,265	16.7	580.87	14.3
7.5	1,726	12.7	546.98	13.5
8.0	1,542	11.4	595.66	14.7
8.5	918	6.8	427.10	10.5
9.0	710	5.2	393.64	9.7
9.5	282	2.1	184.55	4.5
10.0	135	1.0	103.40	2.5
10.5	122	0.9	108.53	2.7
11.0	37	0.3	37.97	0.9
11.5	24	0.2	28.22	0.7
12.0	37	0.3	49.58	1.2
Total	13,575		4,062.59	

Table 40. Length-frequency distribution for redear harvested from Jimmerson Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
6.5	11	0.6	2.23	0.2
7.0	136	7.0	34.51	3.3
7.5	125	6.4	39.02	3.7
8.0	295	15.2	111.80	10.7
8.5	307	15.8	139.58	13.4
9.0	454	23.4	245.08	23.5
9.5	239	12.3	151.77	14.5
10.0	239	12.3	177.05	17.0
10.5	68	3.5	58.32	5.6
11.0	11	0.6	10.85	1.0
11.5	23	1.2	25.93	2.5
12.0	11	0.6	14.09	1.4
12.5	23	1.2	33.30	3.2
Total	1,942		1,043.53	

Table 41. Length-frequency distribution for yellow perch harvested from Jimmerson Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
5.5	43	9.1	3.27	4.1
6.0	64	13.6	6.45	8.1
6.5	130	27.4	16.94	21.2
7.0	76	16.0	12.57	15.7
7.5	64	13.5	13.22	16.5
8.0	76	16.0	19.33	24.2
9.0	22	4.6	8.18	10.2
Total	475		79.96	

Table 42. Length-frequency distribution for largemouth bass harvested from Jimmerson Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
11.0	6	3.6	3.94	1.1
14.0	24	14.2	32.88	9.5
14.5	25	14.8	38.11	11.1
15.0	36	21.3	60.86	17.7
15.5	18	10.7	33.63	9.8
16.0	36	21.3	74.11	21.5
18.0	6	3.6	17.69	5.1
20.0	6	3.6	24.40	7.1
21.0	6	3.6	28.31	8.2
21.5	6	3.6	30.42	8.8
Total	169		344.35	

Table 43. Length-frequency distribution for rock bass harvested from Jimmerson Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
7.0	19	12.8	4.82	6.7
8.0	45	30.4	17.05	23.7
8.5	19	12.8	8.64	12.0
9.0	28	18.9	15.11	21.0
9.5	9	6.1	5.72	7.9
10.0	28	18.9	20.74	28.8
Total	257		140.12	

Table 44. Length-frequency distribution for black crappie harvested from Jimmerson Lake, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
9.5	19	48.7	8.68	41.1
10.0	10	25.6	5.33	25.2
11.0	10	25.6	7.11	33.6
Total	39		21.13	

Table 45. Species, number and weight of additional fish harvested from Jimmerson Lake, 2000.

Species	Number Harvested	Total Weight (lbs.)
Warmouth	24	6.13
Bullheads	17	26.09
Pumkinseed	10	2.04
Northern pike	8	33.44
Total	59	67.70

Table 46. Number of bass and northern pike caught and released at Jimmerson Lake, 2000

Species	Number Released
Largemouth bass	8,128
Smallmouth bass	234
Northern pike	36
Total	8,398

Table 47. Length-frequency distribution for bluegill harvested from the Otter Lakes, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
5.5	159	2.5	19.46	1.1
6.0	734	11.5	117.31	6.4
6.5	1,209	18.9	247.01	13.4
7.0	1,487	23.3	381.35	20.7
7.5	1,388	21.7	439.87	23.9
8.0	793	12.4	306.33	16.6
8.5	297	4.7	138.18	7.5
9.0	198	3.1	109.77	6.0
9.5	79	1.2	51.70	2.8
10.0	20	0.3	15.32	0.8
10.5	20	0.3	17.79	1.0
Total	6,384		1,844.09	

Table 48. Length-frequency distribution for black crappie harvested from the Otter Lakes, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
6.0	27	1.8	3.09	0.6
6.5	67	4.4	9.77	1.8
7.0	281	18.3	51.22	9.5
7.5	187	12.2	41.96	7.8
8.0	214	13.9	58.31	10.8
8.5	94	6.1	30.74	5.7
9.0	147	9.6	57.1	10.6
9.5	187	12.2	85.48	15.9
10.0	147	9.6	78.41	14.6
10.0	147	9.6	90.82	16.9
11.0	27	1.8	19.19	3.6
12.0	13	0.8	12.01	2.2
Total	1,538		538.10	

Table 49. Length-frequency distribution for largemouth bass harvested from the Otter Lakes, 2000.

Total Length (in.)	Number Harvested	Percent	Total Weight (lbs.)	Percent
14.0	5	13.9	6.85	8.7
14.5	21	58.3	32.02	40.8
15.0	5	13.9	8.45	10.8
23.0	5	13.9	31.14	39.7
Total	36		78.46	

Table 50. Number of bass caught and released at the Otter Lakes, 2000.

Species	Number Released
Largemouth bass	3,236
Smallmouth bass	2
Total	3,238

Table 51. Species, number and weight of additional fish harvested from the Otter Lakes, 2000.

Species	Number Harvested	Total Weight (lbs.)
Redear	39	14.88
Yellow perch	5	1.58
Total	44	16.46

Table 52. Species preference of angling parties interviewed at the Lake James Chain, 2000.

Species	Number of Parties	Percent
Bass	434	42.9
Bluegill	193	19.1
Panfish	163	16.1
Anything	143	14.1
Bluegill & Redear	28	2.8
Bass & Bluegill	18	1.8
Crappie	12	1.2
Northern pike	9	0.9
Bass & Panfish	6	0.6
Yellow perch	2	0.2
Bass & pike	2	0.2
Redear	1	0.1
Total	1,011	

Table 53. County of residence of angling parties interviewed at The Lake James Chain, 2000.

County	Number of Parties	Percent
Lake resident	244	24.4
Steuben	209	20.9
Allen	185	18.5
State of Ohio	87	8.7
Dekalb	68	6.8
State of Michigan	30	3.0
Other States	29	2.9
LaGrange	27	2.7
Madison	13	1.3
LaPorte	12	1.2
Elkhart	9	0.9
Huntington	9	0.9
Noble	9	0.9
Grant	7	0.7
Decatur	6	0.6
Porter	5	0.5
Whitley	5	0.5
Tippecanoe	4	0.4
Adams	3	0.3
Henry	3	0.3
Kosciusko	3	0.3
Lake	3	0.3
Marion	3	0.3
St. Joseph	3	0.3
Hamilton	2	0.2
Hendricks	2	0.2
Howard	2	0.2

Marshall	2	0.2
Starke	2	0.2
Wabash	2	0.2
Bartholomew	1	0.1
Brown	1	0.1
Dubois	1	0.1
Franklin	1	0.1
Gibson	1	0.1
Hancock	1	0.1
Jay	1	0.1
Miami	1	0.1
Ohio	1	0.1
Vermillion	1	0.1
Wayne	1	0.1
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Total	999	

Table 54. Largemouth bass population estimates for the lakes of the Lake James Chain, 2000.

LMB Size	James	%	Jimmerson	%	Snow	%	Otters	%	Chain	%
All LMB	13,651		8,276		8,812		2,778		33,517	
>= 8"	10,031	73.5	6,099	73.7	7,817	88.7	2,418	87.0	26,365	78.7
>= 12"	2,617	19.2	2,459	29.7	3,967	45.0	1,080	38.9	9,083	27.1
>= 14"	687	5.0	917	11.1	1,906	21.6	475	17.1	3,019	9.0
>= 18"	74	0.5	190	2.3	137	1.6	96	3.5	485	1.4

Table 55. Stock size largemouth bass population estimates for the lakes of the Lake James Chain, 2000.

LMB Size	James	%	Jimmerson	%	Snow	%	Otters	%	Chain	%
>= 8"	10,031		6,099		7,817		2,418		26,365	
8"-11.5"	7,414	73.9	3,640	59.7	4,767	61.0	1,339	55.4	17,282	65.6
12"-13.5"	1,930	19.2	1,542	25.3	2,061	26.4	605	25.0	6,064	23.0
14"-17.5"	613	6.1	727	11.9	852	10.9	379	15.7	2,534	9.6
>= 18"	74	0.7	190	3.1	137	1.8	96	4.0	485	1.8

Table 56. Average number of stock size largemouth bass per acre in small, medium and large natural lakes in Indiana prior to the imposition of a 12" minimum size limit. Number of lakes averaged in ().

LMB Size	Small (12) (<100 ac)	Medium (21) (100-499 acres)	Large (13) (≥ 500 acres)
≥ 8"	17.8	11.4	8.5
≥ 12"	4.4	3.1	2.0
≥ 14"	2.1	1.7	0.8
≥ 18"	0.7	0.4	0.2

Table 57. Estimated number of largemouth bass per acre for the lakes of the Lake James Chain, 2000.

LMB Size	James	Jimmerson	Snow	Otters	Chain
All LMB	12.1	23.2	24.1	27.0	17.2
≥ 8"	8.9	17.1	21.4	23.5	13.5
≥ 12"	2.3	6.9	8.3	10.5	4.7
≥ 14"	0.6	2.6	2.7	4.6	1.5
≥ 18"	0.1	0.5	0.4	0.9	0.2